Magnesium therapy in acute myocardial infarction
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Authors' objectives
To investigate the effect of intravenous magnesium on arrhythmias and mortality in acute myocardial infarction (MI).

Searching
A MEDLINE search from 1991 to December 1993 was carried out, and a search of the bibliographies of two meta-analyses was undertaken. No search strategy was given.

Study selection
Study designs of evaluations included in the review
9 double-blind trials and one single-blind clinical trial. The results of two meta-analyses of these studies are also reported.

Specific interventions included in the review
Intravenous magnesium administered in pharmacological doses. Dosage varied between 12 and 92 mmol magnesium sulfate or magnesium chloride, given in one dose or in separate doses on 3 successive days.

Participants included in the review
Patients with confirmed or suspected MI. All but one study included only patients with proven MI. The mean age of patients in the studies varied from 50 to 68 years. The majority of patients in both control and treatment groups in the included studies were male.

Outcomes assessed in the review
Mortality during follow-up period (ranging mainly from 24 hours to 35 days). Arrhythmias (including ventricular or atrial fibrillation, ventricular tachycardia and bradycardia) during follow-up period. Side-effects of treatment. Follow-up period mainly ranged from 24 hours to 28 days.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the authors performed the selection.

Assessment of study quality
Trials were included if they were randomised and single or double-blinded. The authors do not state how the papers were assessed for validity, or how many of the authors performed the validity assessment.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the authors performed the data extraction.

Methods of synthesis
How were the studies combined?
The studies were combined in a narrative review with the study details presented in tabular format, though the results of two recently-published meta-analyses, which were based on the included studies, were also reported. These results were used to provide a quantitative summary of the effect of the treatment.

The first of the meta-analyses reported mortality rates of 5.2% in the treated group and 10.9% in the control group.
(OR=0.45, 95% CI 0.28-0.71, p=0.0006). The equivalent figures for the second meta-analysis were 3.8% and 8.2%(OR=0.45, 95% CI 0.28-0.71, p<0.001).

How were differences between studies investigated?
Sources of heterogeneity were investigated narratively, including baseline differences between studies, but no quantitative test for heterogeneity was carried out.

Results of the review
Ten studies in total (9 double-blinded and one single-blinded) examined the effect on mortality and reported arrhythmia. This represents a total of 58,204 patients: 29,097 patients in the treatment group and 29,107 in the control group.

Seven studies reported a reduction in mortality associated with magnesium treatment, though it was not possible to determine whether magnesium prevented early or late mortality. Magnesium reduced the incidence of arrhythmias in 7 studies though only one reduction reached significance. There was conflicting evidence regarding the effect of magnesium on bradycardia; one study reporting an increase and one a decrease in bradycardia with treatment.

Of the two studies reporting on long-term outcome, one found a reduction in 1-year mortality associated with treatment. Only two studies reported side-effects associated with treatment: one reporting a higher incidence of bradycardia, the other reporting flushing in one-third of patients upon receiving the magnesium infusion.

Authors' conclusions
There is no clear evidence of any benefit associated with magnesium treatment in acute myocardial infarction.

CRD commentary
Given the large differences between the included trials (for example, in terms of study design, as discussed by the authors), the conclusion that there is no argument for magnesium therapy seems warranted. It is also possible that the search did not find some published trials.

Bibliographic details

PubMedID
7731491

Other publications of related interest
1. The ISIS-4 results, reported in preliminary form in this review, have now been published as: ISIS Collaborative Group, ISIS-4: a randomised factorial trial assessing early oral captopril, oral mononitrate, and intravenous magnesium sulphate in 58,050 patients with suspected acute myocardial infarction. Lancet 1995;18:345(8951):669-85.


Indexing Status
Subject indexing assigned by NLM

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.